

Integrating the Learning Management System with other Online Administrative Systems at AOU

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Abstract - This paper follows the progress of improving the Arab Open University's Learning Management System by integrating it with other online systems, such as the university's Student Information System and the Human Resource System. A complete description of the open source learning management system, Moodle, and the benefits of adapting open source platforms is presented. The paper also presents in detail the procedures of integrating LMS Moodle with SIS and HR systems. Finally, we introduce the main integrated tools that have been added to the learning management system in order to enhance this online learning platform for the benefit of the learning outcomes and the management procedures.

Keywords CMC, e-learning, integrating LMS-SIS, open learning

1. Introduction

The growth of Internet-based technology have brought new opportunities and methodologies to education and teaching represent in e-learning, online learning, distance learning, and open learning. These approaches are typically use in place of traditional methods and mean that students deliver their knowledge though the web rather than face-to-face tutoring.

Researchers and practitioners were divided into two camps when the concept of distance learning was proposed. Some believed that online and distance learning will reduce the quality of education based on the absence of face-to-face relationships between students and their tutors, and between the student themselves [1], [8]. Others supported using Internet-based education, and proved the effectiveness of it by applying both methods in parallel on some courses and comparing student's results, which were nearly equivalent [10], [5].

In the same respect, many studies address the challenges of distance learning to be accepted in the education community [3]. Johnson *et al.* [4] claim that "the primary among these challenges is how to meet the expectations and needs of both instructor and the student and how to design online courses so they provide a satisfying and effective learning environment". Owston [7] agrees that "the key to promoting improved learning with the web appears to lie in how effectively the medium is exploited in the teaching and learning situation". Different e-learning systems such as BlackBoard and WebCT were used in different educational institutions to build and design online courses.

In this paper, an electronic platform system called Moodle is presented as an open source learning management system (LMS) used in the Arab Open University. Moodle is currently used by more than 2500 educational institutions around the world to deliver online courses and to supplement traditional face-to-face courses. Section 2 discusses the Arab Open University policy. Integration between the LMS and SIS is described in section 3. Section 4 investigates the LMS development process. The conclusion is presented in section 5.

2. Arab Open University Policy

Arab Open University was established in 2002 in the Arabic region, and adopted the open learning approach. AOU has partnerships with the United Kingdom Open University (UKOU) and other national educational institutes, such as MoHE, and international institutions, including UNISCO, to help ensure a high quality of teaching.

An open learning system is defined as "a program offering access to individuals without the traditional constraints related to location, timetabling, entry qualifications."¹ The aim of AOU is to attract large number of students who can not attend traditional universities because of work, age, financial reasons and other circumstances. The "open" terminology in this context means the freedom from many restrictions or constraints imposed by regular higher education institutions which include the time, space and content delivery methods.

Freed *et al.* [1] claimed that the "interaction between instructors and students and students to students remained as the biggest barrier to the success of educational media". The amount of interaction plays a great role in course effectiveness [9]. For this purpose and to reduce the gap between distance learning and regular learning, the AOU requires student to attend weekly tutorials. Some may argue that it is not open in this sense; however the amount of attendance is relatively low in comparison with regular institutions. For example, 3 hours modules which require 48 hours attendance in regular universities, is reduced to 12 hours attendance in the AOU.

At the beginning the AOU used the FirstClass system as a computer mediated communication (CMC) tool to achieve a good quality of interaction. The FirstClass tool provides email, chat, newsgroups and conferences as possible mediums of communication between tutors, tutors and their students, and finally between students themselves. The most important reason behind using FirstClass was the tutor marked assignment (TMA) handling services it provided. However, the main servers are located in the UKOU which influences the control process, causes delays, and totally depends on the support in UKOU for batch feeds to the FirstClass system [2].

To overcome these problems, AOU use Moodle nowadays as an electronic platform. Moodle is an open-source course management system (CMS) used by educational institutes, business, and even individual instructors to add web technology to their courses. A course management system is "often internet-based, software allowing instructors to manage materials distribution, assignments, communications and other aspects of instructions for their courses."² CMS's, which are also known as learning management systems (LMS) or virtual learning environments (VLE), are web applications, meaning they run on a server and are accessed by using a web browser. Both students and tutors can access the system from anywhere with an Internet connection. Moodle provides many learning tools and activities such as forums, chats, quizzes, surveys, gather and review assignments, and recording grades.

Moodle was used in AOU mainly to design a well formed learning management system which facilitates the interaction among all parties in the teaching process, students and tutors, and more over to integrate the LMS with the student information system (SIS).

¹ www.lmuaut.demon.co.uk/trc/edissues/ptgloss.htm

² <http://alt.uno.edu/glossary.html>

3. Integrating LMS with SIS system

The student information system is an Oracle based program which provides the necessary information such as students' information, courses registered, faculties, grades, etc. LMS integration with SIS (or LMS-SIS) is a system used inside the university to reducing accessing time, automatically generating accounts, minimizing faults, mistakes and errors to null, obtaining availability of requirements and simplifying registering, entering and filling process.

The SIS of AOU is organized into three logical layers: presentation, business logic, and data. Any change to an existing production system is a risk, so it is wise to try to fulfill the needs of other systems and users while minimizing disturbance to the existing systems. The idea is to isolate the internal structure of the SIS. Isolation implies that changing to one of the SIS internal structures or business logic should not effect other applications like LMS. Reading data from a system usually requires little or no business logic or validation. In these cases it can be more efficient to access raw data that a business layer has not modified. Many pre-existing applications couple business and presentation logic so that the business logic is not accessible externally. In other cases, the business logic may be implemented in a specific programming language without support for remote access. Both scenarios limit the potential to connect to an application's business logic layer.

When making updates to SIS's data, the advantages of its business logic is that it performs validation and data integrity checks, and this should be considered. The integration between SIS and LMS at the logical data layer is achieved by allowing the data in SIS to be accessed by LMS as shown in Figure 1.

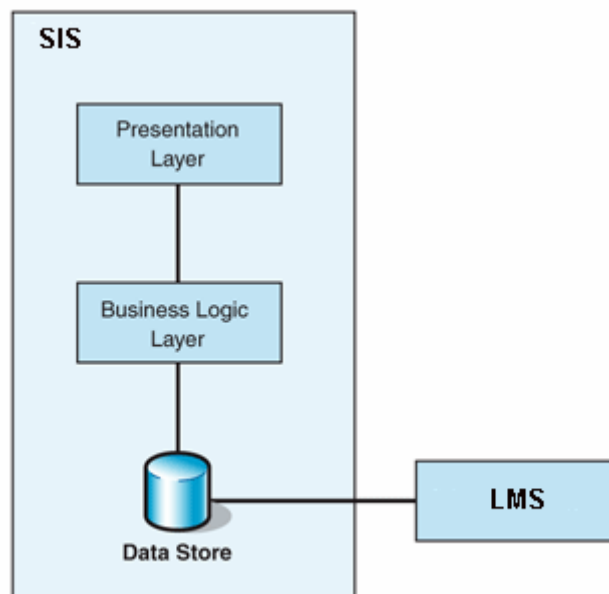


Figure 1: SIS-LMS integration

To connect SIS and LMS at the logical data layer, multiple copies of the database are generated instead of sharing a single instance of database between applications, so that each application has its own dedicated store. To keep these copies synchronized, data is copied from one data store to another. This approach is common with packaged applications because it is not intrusive. However, it implies that at any time, the different data stores are slightly out of synchronization due to the latency that is inherent in propagating the changes from one data store to the next.

4. LMS development

LMS development is divided into two categories: LMS-SIS integration and LMS modification and programming. Figure 2 shows the LMS main page.



Figure 2: LMS main page

4.1 LMS-SIS integration

LMS-SIS integration added a lot of facilities as shown in Figure 3, which reduces time and cost in the following ways:

- Automatic structure enrollment: each student is provided with a username and password which enable students to register automatically.
- Automatic course enrollment: students are automatically enrolled into LMS courses they have been registered.
- Automatic group enrollment: students are automatically enrolled into LMS courses group, as they registered this group in the university.
- Automatically withdraw students from courses where students want to drop or have some financial problems.
- Student semester grades: students are enabled to see their grades through the LMS rather than bringing it from registrar.
- Students registered courses: where students could see the registered courses information such as their groups, time, course names and short names.
- Student's financial issues: where students could see their financial status and payment schedule.

The process is applied by establishing a secure connection to SIS with the minimum privileges, then acquiring data from SIS, after that manipulating it into the LMS as follows:

- Checking if a student exists, if not, register him/her and create a username and password.
- Enrolling students into their courses, and then enroll them into their groups.
- Checking if there is any change in courses or groups and setting data as it appears in SIS.
- Acquiring grades and schedule for students from SIS.
- Checking students with financial problems, and withdraw them from LMS.
- Enrolling new students into placement test, and update their results into SIS.

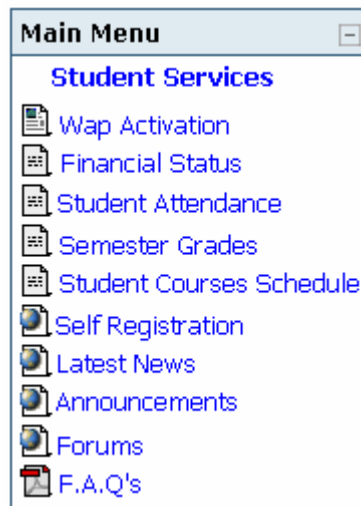


Figure 3: student information system/services inside the LMS

4.2 LMS modification and enhancement

To fit the AOU requirements and specification, a number of modifications and customizations were made (see Figure 4), including:

- Log records. Logs are replicated into other isolated tables, to increase performance, and to keep track records for long period, while removing these log records from original tables.
- Some facilities and activities are added.
- Students attendance and absences sheets are provided.
- Grades customizations (fractions) excel sheets are available.
- Randomly captured assignments for quality assurances purposes.
- WAP (wireless application protocol) services (grades, schedule, financial issues, news) are presented.

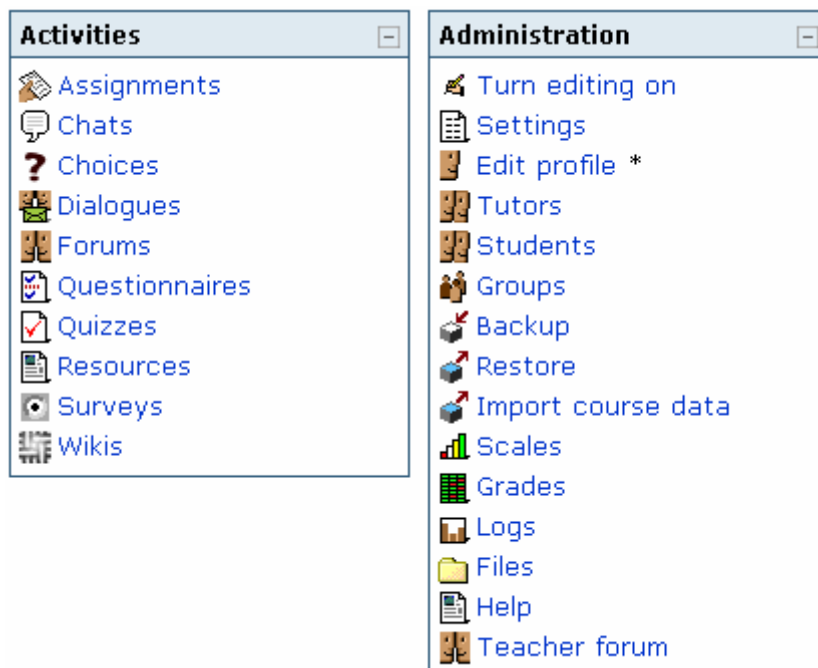


Figure 4: LMS course activities and administration

6. Conclusion

The open learning and distance learning become widely used as a way of teaching in the education community. The need for learning management systems to deliver the courses online becomes a significant issue. We discussed the efficient features of Moodle as a learning management system used in the Arab Open University. In this paper we presented the integration process between learning management system and student information system that has been applied in the Arab Open University. Having consistent data is one of the main cores of the integration process in addition to the saving of efforts of time and cost. Moreover, this integration facilitates a lot of services which were done manually, such as the automatic enrolment process, creating accounts, grade distribution, and others.

7. References

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